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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FEELY, MICHAEL J

ART UNIT	PAPER NUMBER
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1712

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DATE MAILED: 02/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/996,802

Applicant(s)

SATO ET AL.

Examiner

Michael J Feely

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 7-12 is/are rejected.
- 7) ☒ Claim(s) 2-6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "crosslinker", "polymers having crosslinkable functional groups", and "phenol novolak epoxy resin curing agent containing triazine rings" in the resin compound set forth in claim 1. There is insufficient antecedent basis for this limitation in the claim. It appears that this claim should depend on the resin compound set forth in claim 2. Claim 8 is rejected because it depends on claim 7.

Claim Language Suggestion

4. The claim language set forth in claims 1-12 is written in a manner that can be interpreted various ways. However, based upon the Specification (see page 8, lines 7 through page 9, line 16; page 14, lines 10-21), the intended meaning of the claims has been determined. The following suggested changes to the claim language present the instant invention in a clear and precise fashion.

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1. A resin compound used for fabricating an interlayer dielectric of a printed wiring board, wherein the resin compound is formed by dissolving a resin composition in an organic solvent, said resin composition comprises an epoxy based resin, wherein said epoxy based resin comprises:

- a) an epoxy resin;
- b) a nitrogen-containing epoxy resin curing agent; and
- c) maleimide compounds having thermosetting properties;

wherein the nitrogen content in component b) constitutes 5 to 25 wt% of the entire epoxy based resin, and wherein the epoxy based resin is free of halogen elements.

2. The resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 1, wherein said epoxy based resin further comprises:

- d) polymers bearing crosslinkable functional groups; and
- e) a crosslinker, which is added as necessary;

said component a) comprises epoxy resins having two or more glycidyl groups per molecule, and said component b) comprises a phenol novolak epoxy resin curing agent containing triazine rings within a molecule.

3. The resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 2, wherein component a) is free of halogen atoms and is selected from the group consisting of bisphenol A epoxy resin, bisphenol F epoxy resin, novolak epoxy resin, cresol novolak epoxy resin, glycidylamine epoxy resin, and combinations thereof.

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4. The resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 2, wherein component d) is selected from the group consisting of polyether sulfone resin having a terminal hydroxyl group, polyvinyl acetal resin having repeated hydroxyl groups, phenoxy resin, and combinations thereof.
5. The resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 2, wherein component b) is a curing agent or a combination of curing agents selected from the group consisting of melamine, benzoguanamine, a compound obtained from a condensation reaction of phenols and formaldehydes.
6. The resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 2, wherein component c) is selected from the group consisting of N,N'-(4,4-diphenylmethane)bismaleimide; bis(3-ethyl-5-methyl-4-maleimidephenyl)methane; 2,2-bis[4-(4-maleimidephenoxy)phenyl]propane; thermosetting maleimide compounds obtained from Michael addition reaction of these maleimide compounds and polyamines; and combinations thereof.
7. A method for producing the resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 2, wherein said resin composition is added to and is dissolved in the solvent to achieve a resin composition concentration of 40 to 50 wt% of the overall resin compound; wherein said composition comprises:
 - 20 to 70 parts by weight of component a);
 - 10 to 50 parts by weight of component c);

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5 to 30 parts by weight of component d); and

a balance of components b) and e) to achieve a total of 100 parts by weight.

8. The method for producing the resin compound used for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 7, wherein the solvent is a mixed solvent of N-methylpyrrolidone and methyl ethyl ketone, the mixing weight ratio of N-methylpyrrolidone/methyl ethyl ketone being in a range of 50/50 to 40/60.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 and 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito et al. (US Pat. No. 5,932,637).

Regarding claim 1, Ito et al. disclose resin compound used for fabricating an interlayer dielectric of a printed wiring board (Abstract; Examples), wherein the resin compound is formed by dissolving a resin composition in an organic solvent (column 4, lines 39-67), said resin composition comprises and epoxy based resin, wherein said epoxy based resin comprises: a) an epoxy resin (Abstract; column 2, lines 17-40); b) a nitrogen-containing epoxy resin curing agent (Abstract; column 3, lines 31-45); and c) maleimide compounds having thermosetting properties (Abstract; column 2, line 41 through column 3, 30); wherein the nitrogen content in component b) constitutes 5 to 25 wt% of the entire epoxy based resin (column 4, lines 32-38), and wherein the epoxy based resin is free of halogen elements (Abstract; column 1, lines 5-8).

Regarding claims 9 and 11, Ito et al. disclose a resin sheet for forming an insulating layer used for manufacturing a copper-clad laminate, wherein the resin compound for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 1 is made into a sheet which is in a semi-cured state (Example 1); and the copper-clad laminate manufactured by the use of the resin sheet for forming the insulating layer as set forth in claim 9 (Example 1).

Regarding claims 10 and 12, Ito et al. disclose a resin applied-copper foil constituted by forming a resin layer on a surface of a copper foil employing the resin compound for fabricating the interlayer dielectric of the printed wiring board as set forth in claim 1 (Example 1); and the copper-clad laminate manufactured by the use of the resin applied-copper foil as set forth in claim 10 (Example 1).

Allowable Subject Matter

7. Claims 2-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 7 and 8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: claim 2 contains allowable subject matter, claims 3-6 depend on claim 2, and it appears that claims 7-8 were intended to depend on claim 2.

Regarding claims 2, the resin compound comprises a resin composition, which comprises an epoxy based resin, which comprises the following components:

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- a) epoxy resins having two or more glycidyl groups per molecule;
- b) a phenol novolak epoxy resin curing agent containing triazine rings within a molecule;
- c) maleimide compounds having thermosetting properties;
- d) polymers bearing crosslinkable functional groups; and
- e) a crosslinker, which is added as necessary;

wherein the nitrogen content in component b) constitutes 5 to 25 wt% of the entire epoxy based resin.

Ito et al. teach an epoxy based resin comprising components a) and c), and component e) is not required by the claim. However, Ito et al. fail to disclose b) a phenol novolak epoxy resin curing agent containing triazine rings and d) polymers bearing crosslinkable functional groups.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J Feely whose telephone number is 703-305-0268. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Dawson can be reached on 703-308-2340. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

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Michael J. Feely
February 13, 2003

A handwritten signature in black ink, reading "Robert A. Dawson". The signature is fluid and cursive, with a large initial 'R' and a stylized 'A'.

Robert Dawson
Supervisory Patent Examiner
Technology Center 1700